

REDUCING COMPRESSOR STATION AMBIENT NOISE LEVEL BY CONTROLLING COMPRESSOR INTERNAL NOISE SOURCE

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ABSTRACT

Dresser-Rand single stage pipeline booster compressors have been popular for gas transmission applications due to their high efficiency. As more compressors are installed in natural gas compressor stations close to populated areas, the noise level emitted from the compressor stations becomes a concern. To address the potential community noise concerns, Dresser-Rand recently developed a very effective noise control device - the Duct Resonator array or DR array, to attenuate the internal noise of the compressor, which is typically a major noise source of a compressor station. This technology has been validated by extensive in-house experimental study to be acoustically effective and yet have no measurable adverse effect on aerodynamic performance. This paper discusses the application of DR arrays in two compressors that are in-service at a Williams Gas Pipeline compressor station. Note: the DR arrays are now included in the third unit addition. A successful collaboration among the compressor manufacturer, the compressor user, and a third party acoustics expert was coordinated to take acoustic measurements independently to evaluate the noise reduction provided by the DR arrays. The comprehensive acoustic data acquisition included sound pressure level and sound intensity level measurements around each of the two compressors and several noise level surveys both inside and outside of the compressor building. Noise testing was first performed on each of the two compressors prior to the installation of the DR arrays and was repeated after the compressor hardware modification with DR arrays. A comparison of the noise data recorded before and after the installation of the DR arrays confirmed that the compressor noise level inside the compressor building and the noise level outside of the building were reduced significantly. The DR array has proved to be an efficient and effective device for reducing noise and vibration levels of both existing and new centrifugal compressors and associated piping.

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